

CLAIMS

1. 1. A method for recognizing reading, skimming, and scanning modes from eye-gaze patterns, said method comprising the steps of:
 - 3 quantizing eye movements of a user viewing heterogeneous content in both X and Y axes;
 - 4 accumulating a numerical evidence of reading until a predetermined threshold is reached; and
 - 5 detecting reading when said numerical evidence of reading exceeds said threshold.

1. 2. A method for recognizing reading, skimming, and scanning modes from eye-gaze patterns, as per claim 1, wherein said quantizing step includes averaging over a predetermined period of time.

1. 3. A method for recognizing reading, skimming, and scanning modes from eye-gaze patterns, as per claim 1, wherein said heterogeneous content includes at least one of the following: text, images, hyperlinks, windows, icons, and menus.

1. 4. A method for recognizing reading, skimming, and scanning modes from eye-gaze patterns, as per claim 1, comprising the further step of switching modes from a skimming mode and a scanning mode to a reading mode when said reading is detected.

1 5. A method for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 4, comprising the further step of adapting to said user's need if said reading is
3 detected.

1 6. A method for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 5, wherein said adapting step comprises the further steps of:
3 recording said heterogeneous content that is of interest to said user;
4 finding relevant information from a database using said recorded heterogeneous content; and
5 utilizing said found relevant information to adapt to a user's needs.

1 7. A method for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 6, wherein said utilizing step comprises the further step of developing accurate
3 models of said users.

1 8. A method for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 6, wherein said utilizing step comprises the further step of determining fine-
3 grained information regarding said user's interest in Internet advertising.

1 9. A method for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 6, wherein said utilizing step comprises the further step of providing more
3 accurate help regarding computer applications.

1 10. A method for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 6, wherein said database includes at least one of the following: a local machine
3 database, a local area network database, and a wide area network database.

1 11. A method for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 10, wherein said wide area network database is the world wide web.

1 12. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 said system comprising:

3 an eye-movement quantizer that quantizes eye movements of a user viewing heterogeneous
4 content in both X and Y axes;

5 a reading-evidence accumulator that accumulates a numerical evidence of reading;

6 a threshold-comparator that compares said numerical evidence of reading against a
7 predetermined threshold; and

8 a reading-detector that detects reading when said numerical evidence of reading exceeds said
9 predetermined threshold.

1 13. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 12, wherein said eye-movement quantizer averages over a predetermined period
3 of time.

1 14. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 12, wherein said heterogeneous content includes at least one of the following:
3 text, images, hyperlinks, windows, icons, and menus.

1 15. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 12, further comprising a mode-switcher that switches modes from a skimming
3 mode and a scanning mode to a reading mode when said reading is detected.

1 16. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 15, wherein said mode-switcher generates a user adaptation command signal
3 when switching to said reading mode.

1 17. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 16, wherein, in response to said user adaptation command signal:
3 records said heterogeneous content that is of interest to said user;
4 finds relevant information from a database using said recorded heterogeneous content; and
5 utilizes said found relevant information to adapt to a user's needs.

1 18. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 17, wherein the system develops accurate models of said users.

1 19. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 17, wherein the system determines fine-grained information regarding said user's
3 interest in Internet advertising.

1 20. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 17, wherein the system provides more accurate help regarding computer
3 applications.

0
1 21. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 17, wherein said database includes at least one of the following: a local machine
3 database, a local area network database, and a wide area network database.

0
1 22. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 as per claim 21, wherein said wide area network database is the world wide web.
3

1 23. A system for recognizing reading, skimming, and scanning modes from eye-gaze patterns,
2 said system comprising:
3 means for quantizing eye movements of a user viewing heterogeneous content in both X and
4 Y axes;
5 means for accumulating a numerical evidence of reading;
6 means for comparing said numerical evidence of reading against a predetermined threshold;
7 and
8 means for detecting reading when said numerical evidence of reading exceeds said
9 predetermined threshold.

1 24. An article of manufacture comprising a computer program product having a machine-
2 readable medium including computer program instructions embodied therein for recognizing
3 reading, skimming, and scanning from eye-gaze patterns with:
4 computer program instructions for quantizing eye movements of a user viewing
5 heterogeneous content in both X and Y axes, said quantizing based on averaging over a
6 predetermined period of time;
7 computer program instructions for accumulating a numerical evidence of reading until a
8 predetermined threshold is reached;
9 computer program instructions for detecting reading when said numerical evidence of
10 reading exceeds said predetermined threshold; and
11 computer program instructions for switching modes from a scanning mode and a skimming
12 mode to a reading mode when reading is detected.

1 25. An article of manufacture comprising a computer program product having a machine-
2 readable medium including computer program instructions embodied therein for utilizing
3 user interest information to adapt a computer to a user's needs with:
4 computer program instructions for recording eye-gaze patterns of said user viewing
5 heterogeneous content;
6 computer program instructions for determining from said recorded patterns whether said user
7 is reading, skimming, and scanning;
8 computer program instructions for recording heterogeneous content of interest to said user
9 upon detection of said reading;
10 computer program instructions for finding relevant information from a database using said
11 recorded heterogeneous content of interest; and
12 computer program instructions for adapting said computer to said user's needs using said
13 relevant information.

1 26. A method of paying for Internet advertisements, comprising the steps of:
2 determining viewer activity;
3 recording viewer interests;
4 computing payments based on viewer activity and viewer interests; and
5 paying the recipient.